



AEC-NASA TECH BRIEF



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Computer Program ETC Improves Computation of Elastic Transfer Matrices of Legendre Polynomials $P(0)$ and $P(1)$

Numerical difficulties are encountered with other computer programs in carrying out the double integration that is inherent in the calculation of the $P(0)$ and $P(1)$ matrices. This is particularly true when the elastic scattering cross section depends strongly on the neutron energy, i.e., where resonances occur. Also, other programs are not nearly fast enough for optimization.

Rather than carrying out a double integration numerically, one of the integrations is accomplished analytically and the numerical integration need only be carried out over one variable. This results in a more satisfactory numerical treatment and a faster calculation.

For identical input the ETC program takes about one-third of the time other known programs take to calculate the $P(0)$ and $P(1)$ kernels. The ETC program has also been made more flexible, viz., any number (<200) of energy mesh points may be used per fine group (GAM Groups: $1/4$ lethargy intervals, 68 groups from 0.414 eV to 10 MeV). This number

may vary from group to group. This feature may be utilized to save additional computer time.

Notes:

1. The program is written in Fortran IV for use on the IBM 7094 or the CDC 6600 computer. It can be used for the calculation of multigroup cross sections for analysis of any nuclear reactor for any application.
2. Inquiries concerning this program may be made to:
COSMIC
Computer Center
University of Georgia
Athens, Georgia 30601
Reference: B67-10566

Patent status:

No patent action is contemplated by AEC or NASA.

Source: G. Gibson and M. Miller
of Westinghouse Astronuclear Laboratory
under contract to
AEC-NASA Space Nuclear Propulsion Office
(NUC-10070)

Category 06